

REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1, 3-9 and 11-21 are pending in the present application. Claims 1, 3, 4, 8, 9, 12-14 and 18 have been amended and Claim 21 has been added by the present amendment.

In the outstanding Office Action, it was indicated that Claims 1-20 are pending in the application (note, however, that Claims 2 and 10 were cancelled in the amendment filed on October 23, 2002), Claims 1, 8, 9 and 18 were rejected under 35 U.S.C. § 112, and Claims 1, 8 and 9 were rejected under 35 U.S.C. § 102(b) as anticipated by Kahn.

Regarding the rejection of Claims 1, 8, 9 and 18 under 35 U.S.C. § 112, Claims 1, 8, 9 and 18 have been amended in light of the comments noted in the outstanding Office Action and as shown in the marked-up copies. Accordingly, it is respectfully requested this rejection be withdrawn.

Claims 1, 8 and 9 stand rejected under 35 U.S.C. § 102(b) as anticipated by Kahn. This rejection is respectfully traversed.

Amended Claim 1 is directed to a method for protecting an original audio signal against unauthorized recording thereof by a recorder by combining the original audio signal with at least one inaudible disturbance signal for providing a combined signal. The original audio signal is combined such that the combined signal sounds undisturbed when played and a recording of the combined signal by said recorder is disturbed. Independent Claims 8 and 9 include similar features.

According to the present invention, a source (or original) audio signal, which may be an analog or digital signal, is combined with an inaudible disturbance signal to provide a combined signal, such that a disturbance of the combined signal with respect to the source signal is inaudible (see page 1, lines 27-29 (“effectively undisturbed”); page 2, line 8 (“not

audible”); page 2, line 16 (“normally non-audible”); page 4, line 36 (“not audible”); and page 5, line 16 (“normally non-audible”). The combining of the source signal with an inaudible disturbance signal to provide such combined signal is described also as a non-limiting example with reference to figure 12. According to the claimed method, both the source signal and the combined signal can be an analog or digital signal.

Thus, the combined signal effectively protects the source signal against copying without being noticeable in the combined signal when played. However, when replaying a signal provided by copying the combined signal onto a medium, a distortion in the replayed signal will be audible (see for example page 1, lines 29-30 (“but which shows audible disturbances when copied”); page 2, lines 1-4 (“slowly varying signals cause ... to effectively erase the recorded signal”); page 2, lines 9-10 (“yet they have the above-mentioned erasing effect”); page 2, lines 17-19 (“copying of the signal will result in an incomplete demodulation of the combined signal”); page 2, lines 35-37 (“clearly audible amplitude modulation in the copied signal”); page 4, lines 36-39 (“when ... copied onto tape ... results in the recorded signal ... being regularly interrupted”); page 5, lines 3-4 (“the resulting signal of figure 4 has a very poor sound quality”), for a subsonic disturbance signal; page 6, lines 12-18, page 6, lines 23-24, for digital recording; page 7, line 3 (“copying without quality loss”); and page 7, lines 18-19 (“the amplitude variations ... are clearly audible”).

With the claimed method, a replay apparatus need not contain any circuitry to replay a copied combined signal without audible distortion. In fact, the distortion is not intended to be removed and (in most embodiments) cannot be removed.

Contrary to the system disclosed by Kahn, an audible source signal is combined with partly inaudible identifying signals and disturbing signals for producing audible artifacts in the combined signal. The artifacts are introduced on purpose to ensure that a recording of such combined signal will be played back properly only through dedicated play-back

equipment that incorporates protection against unauthorized copying (see for example column 2, lines 13-23 and column 6, lines 17-21). If such disturbed signal is registered on tape, thus providing a protected tape, and if it is then played back, anomalies contained in the output signal must be removed if reasonable sound is to be produced (column 6, lines 59-62). This means that a combined signal of a source audio signal and audible artifacts before such recording must be identical to a signal obtained when playing back the recorded signal. This differs from the method according to the present invention where both signals, at the time of recording and at the time of playing back, are different. With the prior art method, both signals contain audible artifacts. Whereas with the present invention, only the played back signal contains audible disturbances.

With the prior art method, a protected signal should not only contain audible artifacts, but also an identification indicating whether any part of a registered signal is indeed an audible artifact or part of the original audio signal. Therefore, with the prior art method “inaudible identifying signals” are provided (see for example column 1, line 63; column 3, lines 4-12; column 5, lines 40-42; column 5, lines 58-2; column 8, lines 51-66 (“the identifying signal frequency being in the range of 15-22 kHz”); column 8, lines 11-14; column 10 lines 14-20 and lines 56-64 (“identifying audible artifacts by phase modulation at a rate of 25 Hz”)).

Upon detection of the inaudible identifying signal, identifying the presence of audible artifacts by appropriate circuitry in a recorder, a recording function of it will be interrupted (see for example column 7, lines 39-41 and column 15, lines 53-55). Conversely, with the claimed method it is impossible to recover the original clean audio signal from a played back recorded combined signal containing a disturbance signal and therefore there is no need at all to have a play back apparatus contain circuitry to detect protective material in the combined signal before recording thereof.

Although Kahn discloses an embodiment of an anti-copy protecting system in which a high frequency signal in the range of 15-22 kHz (column 8, lines 65-66) or a low frequency signal, for example below 25 Hz (column 10, line 62) is used, it is used only to detect or identify the presence of audible artifact occurring virtually at the same time. Conversely, the method according to the present invention produces audible artifacts or disturbances itself.

Accordingly, it is respectfully submitted Claims 1, 8 and 9 and each of the claims depending therefrom are allowable.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.



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Respectfully submitted,

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IN THE CLAIMS

--1. (Twice Amended) A method [of] for protecting an original audio signal against [copying] unauthorized recording thereof by a recorder, [the method] comprising:

[the step of mixing] combining the original audio signal with at least [a first non-audible] one inaudible disturbance signal for providing a combined signal,

[wherein said first disturbance signal is a low-frequency signal having a frequency of about 2 Hz] said combining being such that the combined signal sounds undisturbed when played and a recording of the combined signal by said recorder is disturbed.

3. (Amended) The method according to claim 1, wherein a second disturbance signal is a high-frequency signal which is multiplied with the original audio signal, the high-frequency disturbance signal having a frequency of approximately 20 kHz.

4. (Amended) The method according to claim 3, wherein the original audio signal is a digital signal representation involving a sampling frequency, and wherein the second disturbance signal has a frequency which varies in time, preferably from approximately half to approximately three quarters of the sampling frequency.

8. (Twice Amended) An information carrier comprising:

a [recording] medium storing [an audio signal, said audio signal is copy protected by mixing the audio signal, prior to storing, with at least one non-audible disturbance signal having a frequency in the range of 1 Hz to 10 Hz] a combined signal which is a combination of an original audio signal and at least one inaudible disturbance signal.

said combination being such that the combined signal sounds undisturbed when played back and a recording of the combined signal by a recorder is disturbed.

9. (Twice Amended) A device for protecting an original audio [signals] signal against [copying] unauthorized recording thereof by a recorder, [the device] comprising:

signal generation means for generating at least one [non-audible] inaudible disturbance signal;

[mixing] combining means for [mixing] combining the original audio signal and the at least one disturbance signal [with the audio signal, wherein said mixing means includes adding means;] and for providing a combined signal; and

output means for outputting [the resulting mixed audio] said combined signal such that the combined signal sounds undisturbed when played and recording of the combined signal by said recorder is disturbed.

12. (Amended) The device according to claim 9, wherein the signal generation means are arranged for generating a first, low-frequency disturbance signal which is added to the original audio signal, the low-frequency disturbance signal preferably having a frequency of approximately 2 Hz.

13. (Amended) The device according to claim 9, wherein the signal generation means are arranged for generating a second, high-frequency disturbance signal which is multiplied with the original audio signal, the high-frequency disturbance signal having a frequency of approximately 20 kHz.

14. (Amended) The device according to claim 13, [the device being arranged for copy protecting an] wherein the original audio signal [which] is a digital signal representation involving a sampling frequency, and wherein the signal generating means are arranged for generating a second disturbance signal having a frequency which varies in time, preferably from approximately half to approximately three quarters of the sampling frequency.

18. (Amended) A method for protecting an original audio signal against [copying] unauthorized recording thereof by a recorder, [the method] comprising:

[mixing] combining the original audio signal with [a non-audible] at least one inaudible disturbance signal for providing a combined signal,

said combining being such that the combined signal sounds undisturbed when played and a recording of the combined signal by said recorder is disturbed, said inaudible disturbance signal being [wherein the mixing step includes adding] a low-frequency disturbance signal [to the audio signal or multiplying the audio signal with a high-frequency disturbance signal to provide direct copy protection functionality].

21. (New).--